Waterfoods Procurement

Harvest method

- Finfish - net or hook (usu. marine), farming
- Shellfish - bottom-dwellers, dredged or tonged
- Shrimp - netted
- lobsters/crabs - trapped

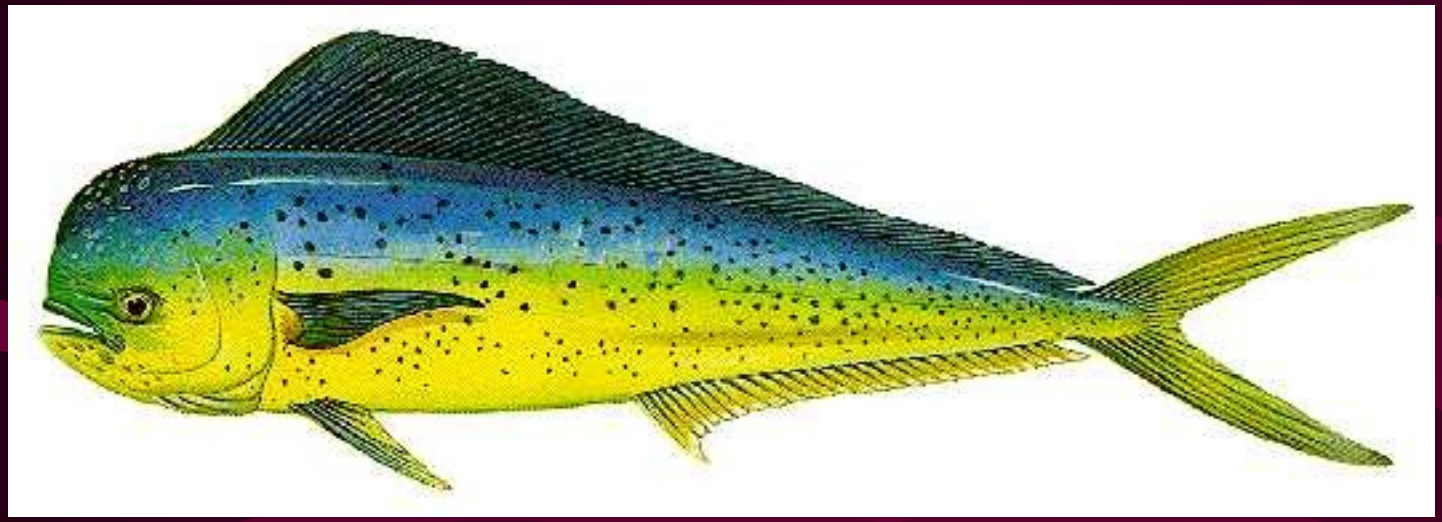
Hazards

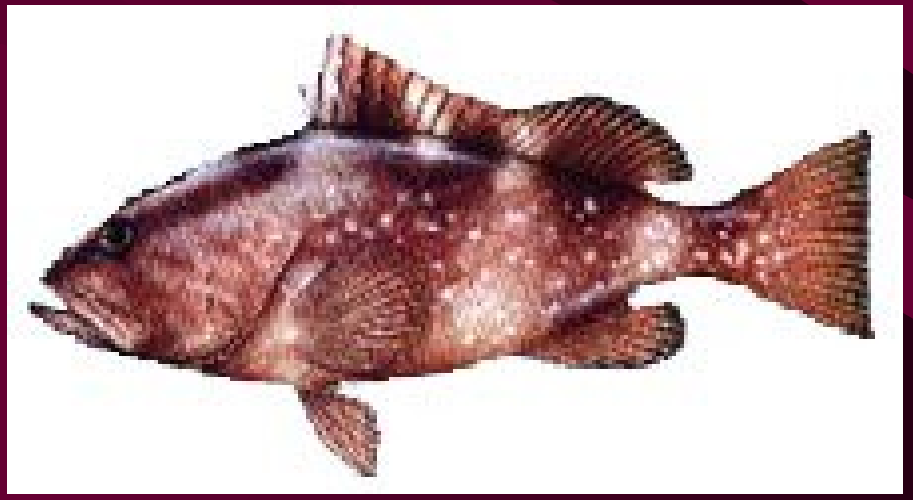
- Shellfish are filter feeders, may concentrate pathogens or toxins
- Shellfish or finfish consumed raw a higher threat
- Finfish predators may concentrate parasites or toxins

Hazards

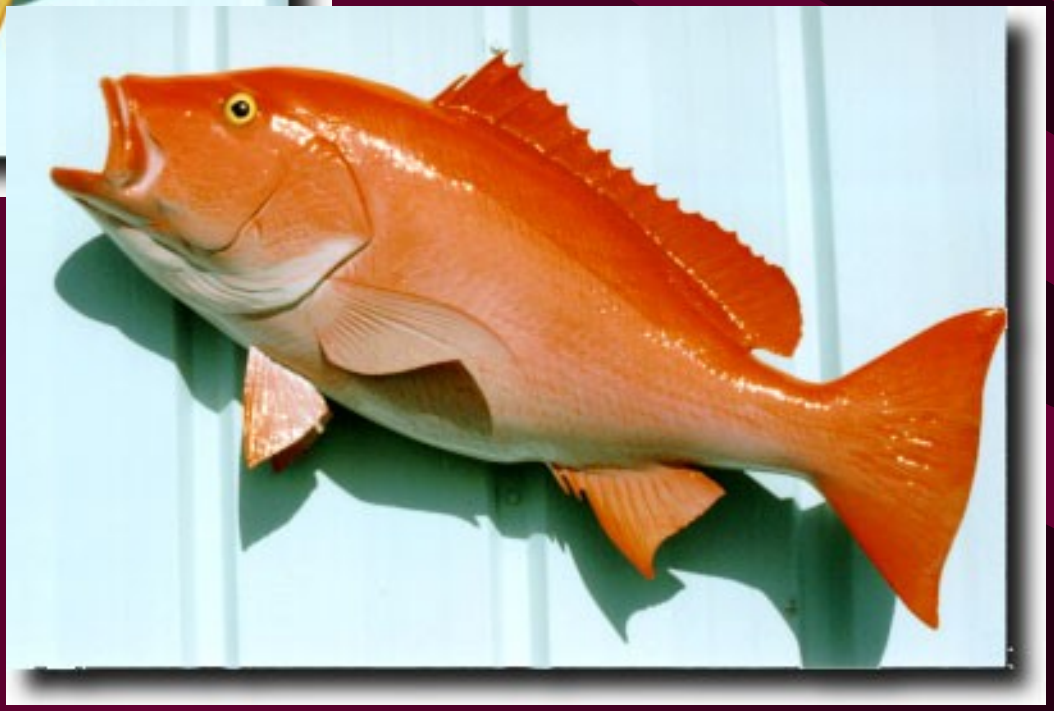
- **Shellfish**
  - **Bacteria: *Salmonella, Shigella, Vibrio* spp.**
  - **Toxins: paralytic shellfish, others**
  - **Viruses: hep A, Norwalk-like**
- **Finfish:**
  - **Bacteria: *B. cereus, C. bot, Salm., Shig., S. aureus, Vibrio cholerae, V. parahemolyticus***
  - **Toxins: Cigua, scombro, tetrodo**
  - **Parasites: anisakids, *D. latum,* flukes**
- **Crustacea: *V. parahemolyticus***

Reef Fish

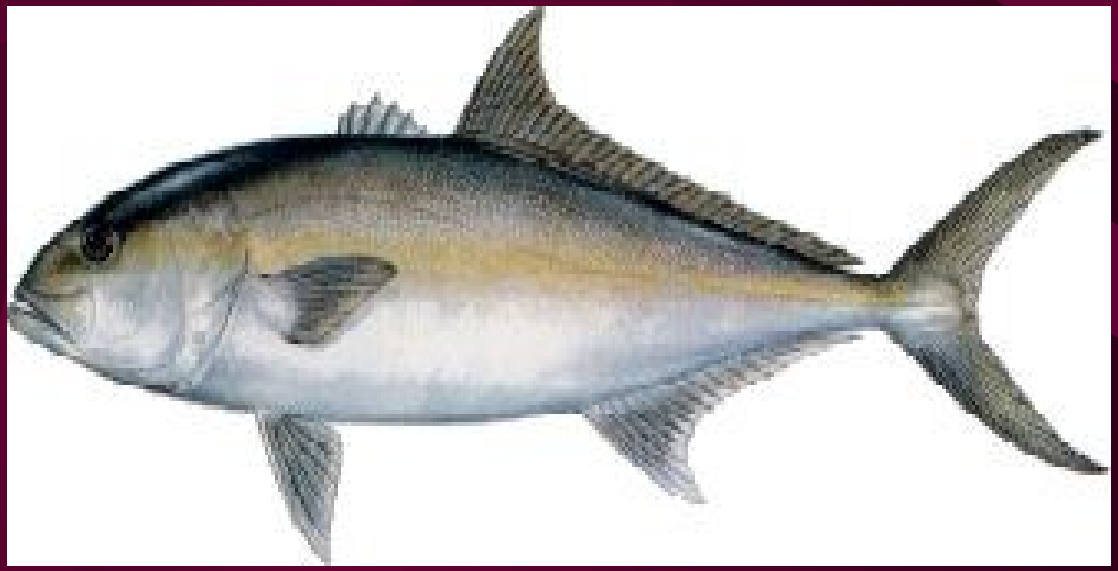




Reef Fish



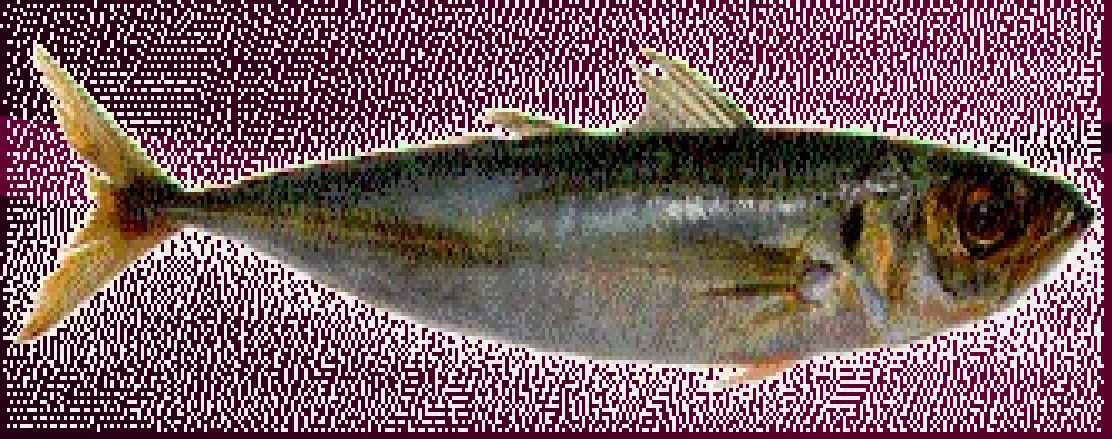
Reef Fish



WORLD RECORD
436 3/4 LB
WARSAW GROUPER
Marina
Point
DESTIN, FL
FISH WARSAW
WEIGHT 436¾
DATE 12-22-85
ANGLER Steve Hasnb
BOAT SUNRISE

Puffer Fish (fugu)

Tuna/Albacore



Mackerel

- Mackerel are smaller fish and come in a variety of types but all with a similar shape
- They may have scombrotoxin

Atlantic Cod

HACCP

- Required for seafoods in USA as of 1997...FDA/USDC enforces
- Emphasis on processors and importers
- Most CCPs based on events at receiving and appropriate temps

Procurement

- **Shellfish: too dangerous to safely procure from questionable sources**
- **Raw finfish: should not be consumed**
- **Finfish for cooking: may be safe to procure**
- **Processed fish: see Mil-Hdbk-3006 for guidelines for various types of processes (Appendix H)**

Processing

- **Acidification and brining - must lower pH and water activity to established levels to prevent growth of *C. botulinum***
- **Battered fish: *Staph aureus* the major hazard**
  - **Toxin growth retarded by temp <50F**
  - **Toxin is heat stable**
- **Smoking - smoke and nitrites retard toxin formation**

Cooking of fish

- **Raw fish - 145F (63C) for 15 sec**
- **Comminuted fish - 155F (68C) for 15 sec**
- **Stuffed fish or stuffing containing fish - 165F (74C) for 15 sec**

Conclusions

- **Processing systems very complicated and critical to preventing botulism**
- **Fresh raw finfish to be cooked for consumption is the safest type of fish product**
- **Much specific detail contained in 3006 checklist that may be difficult to assess under austere conditions**